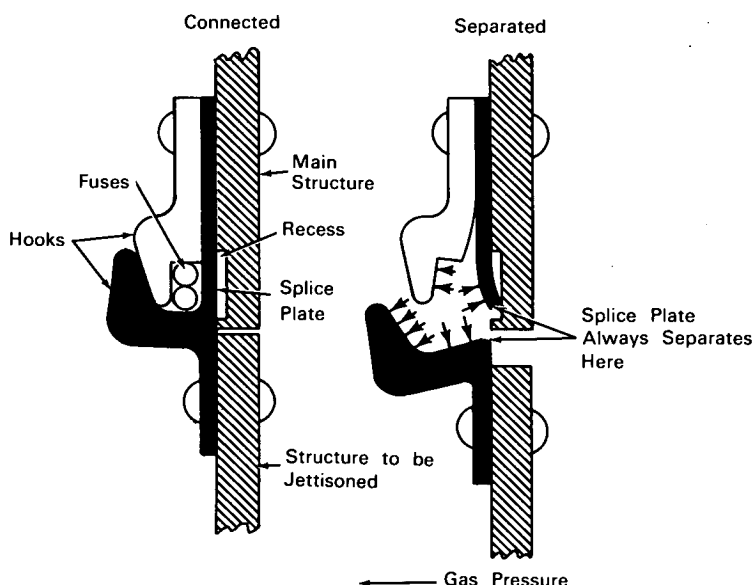


NASA TECH BRIEF



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Splice Plate Design Assures Structural Separation by Mild Explosive



The problem: To provide an efficient and reliable means of rapidly separating a structural splice plate, sheet strap, or other continuous fitting that joins structural members. Previous art has used shaped charges, detonating fuse in notched break lines, or explosive fasteners, all of which have proven inefficient in some applications.

The solution: A mechanical joint of specific configuration is severed cleanly and rapidly by the expanding gases created by ignition of mild detonating fuse.

How it's done: The structures to be separated are joined with a splice plate specially designed to receive two strands of mild detonating fuse along the separation plane. Opposite the detonating fuse the main

structure has a recess machined in it to permit movement of the splice plate. Ignition of the detonating fuse creates high gas pressures in the cavity between the hook-like ends and flat surface of the splice plate. These pressures concentrate high bending moments plus shear stresses on the splice plate along the separation plane. Because the splice plate and reinforcing plate have greater resistance in the hook area, the flat portion of the splice plate opposite the recess in the main structure is forced into the recess and shears at that point. This design greatly increases reliability since separation always occurs across the intended section. This permits design of each particular joint for desired clearances between the joint members during the separation phase and eliminates the danger of interference or hang-up.

(continued overleaf)

Notes:

1. This method efficiently uses the gas pressures generated by a low-yield explosive, thereby eliminating component fragmentation and achieving excellent control of the separation line.
2. In many applications, the detonating fuse may be installed from outside the structure after fabrication, providing an appreciable gain in safety and in time required to arm the joint.
3. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Manned Spacecraft Center
P.O. Box 1537
Houston, Texas, 77001
Reference: B65-10166

Patent status: NASA encourages the immediate commercial use of this invention. It is owned by NASA and inquiries about obtaining royalty-free rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

Source: North American Aviation, Inc. under contract to Manned Spacecraft Center
(MSC-137)